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(72) Inventor; and

(75) Inventor/Applicant (for US only): **GRIPEMARK,**  
Joakim [SE/SE]; O.D. Krooks Gata 39, S-254 43 Helsingborg (SE).

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(74) Agent: **STRÖM & GULLIKSSON IPC AB;** P.O. Box  
4188, S-203 13 Malmö (SE).

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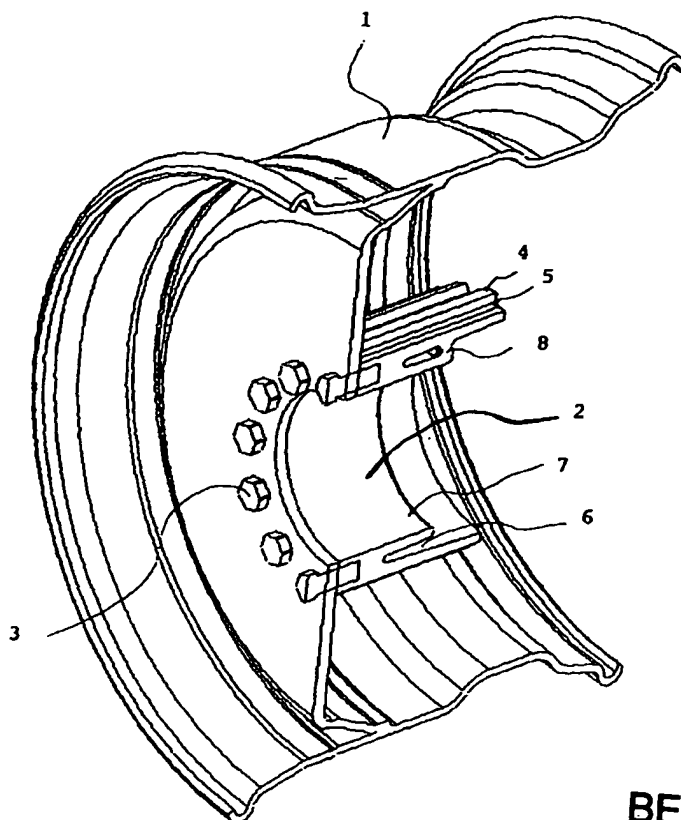
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(71) Applicant (for all designated States except US): **HALDEX**  
**BRAKE PRODUCTS AB** [SE/SE]; Box 501, S-261 24  
Landskrona (SE).

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(54) Title: **SLEEVE FOR A DISC BRAKE**



(57) Abstract: The present invention concerns a sleeve (2) for a disc brake. The sleeve (2) is furnished with splines (4, 5) on the outer periphery for co-operation with one or more brake discs. The sleeve (2) is to be placed on a wheel axle and is attached to a wheel flange (1) by means of a number of bolts (3) received in threaded openings of the sleeve (2). A groove (6) is arranged in the sleeve (2), which groove (6) is parallel with the outer periphery of the sleeve (2) and is open at one end. The sleeve (2) has a generally straight outer periphery allowing the brake disc(s) to be slid off and slid onto the sleeve (2) in any axial direction.

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TITLE: SLEEVE FOR A DISC BRAKE

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Technical Field

The present invention concerns a sleeve for use at a disc brake. The invention is developed for use with brakes for trucks, lorries, busses, trailers or the like, but a person skilled in the art realises that it may be used for any kind of vehicle.

Prior Art

The present invention is intended for use with disc brakes having a fixed caliper. In disc brakes having a fixed caliper one or more brake discs are normally arranged rotatably fixed but axially slideable in relation to the wheel axle. The brake disc is connected to the wheel axle by means of intermediary parts. The intermediary parts are also connected to the wheel flange. In the prior art the number of intermediary parts is often rather high. In view of reducing the complexity and the size of the brake there is a need for a reduced number of intermediary parts. The present invention is directed to said intermediary parts between the brake disc and the wheel axle.

Regarding maintenance one object is that it should be as few steps as possible to replace a brake disc. In the prior art the intermediary parts often comprise a flange disc or a part partly formed as a disc to be attached to the actual wheel flange. If the brake disc is to be replaced the flange disc or the part formed as a disc has to be removed before the disc could be replaced. Thus, one has to go through several steps when replacing a disc brake according to the prior art.

A further problem is that the heat produced during breaking may be quite substantial. Thus, there is a need

for means at the intermediary parts, to protect different parts of the brake and axle against overheating.

#### The Invention

5 One object of the present invention is to arrange the intermediary parts in such a way that a cooling effect is created. The cooling effect is mainly to protect bearing means being part of the intermediary parts. It may also be necessary to protect other parts, such as sensors against  
10 overheating.

The above object is met by a sleeve for a disc brake, which sleeve has means for co-operation with at least one brake disc. The sleeve is to be received on a wheel axle. Furthermore, the sleeve has a groove, the main orientation  
15 of which being parallel with the outer periphery of the sleeve.

A further object of the present invention is to facilitate maintenance of the disc brakes and especially to facilitate replacement of the brake disc.

20 Still a further object of the present invention is to reduce the number of parts used for connecting, directly or indirectly, a brake disc to a wheel axle and wheel flange, respectively.

The integrated sleeve and hub of the present invention reduce the number of intermediary parts between the  
25 wheel axle and the wheel flange from four to two.

Further objects and advantages of the present invention will be obvious for a person skilled in the art when reading the detailed description below of a preferred embodiment.  
30

#### Brief Description of the Drawings

The present invention will be described more closely below with reference to a preferred embodiment, by way of

an example, and with further reference to the enclosed drawings. In the drawings,

Fig. 1 is a perspective view, partly in section of a sleeve according to the present invention fixed to a wheel  
5 flange,

Fig. 2 is a perspective view of the sleeve of Fig. 1, and

Fig. 3 is a perspective view, partly in section, of the sleeve of Figs. 1 and 2 taken from the opposite direc-  
10 tion.

#### Detailed Description of a Preferred Embodiment

The integrated sleeve 2 of the present invention corresponds to a sleeve and hub, normally present at disc  
15 brakes of the prior art.

According to the present invention the integrated sleeve 2 is attached directly to a wheel flange 1. Thus, the wheel flange 1 has to be made strong and stiff enough to carry the sleeve 2 of the disc brake. In the shown em-  
20 bodiment the sleeve 2 is attached to the wheel flange 1 by means of a number of bolts 3. In the shown embodiment there are twelve bolts 3, but a person skilled in the art realises that the number of bolts may be different in other embodiments. The bolts 3 are received in threaded openings of  
25 the sleeve 2. The threaded openings of the sleeve 2 are arranged on the end of the sleeve 2 intended for contact with the wheel flange 1. The threaded openings of the sleeve 2 are adapted to corresponding openings in the wheel flange 1.

30 The integrated sleeve 2 is to be placed on the wheel axle. The inner periphery of the sleeve 2 is received on the wheel axle by way of a bearing means (not shown).

The sleeve 2 is to support one or more brake discs (not shown) by way of means for co-operation with corre-  
35 sponding means of the brake disc(s). In the shown embodi-

ment the means for co-operation with the brake disc(s) is splines. The splines have the form of raised portions 4 and grooves 5 arranged on the outer periphery of the sleeve 2. The actual cross-sectional form of the splines may vary between different embodiments. The splines of the sleeve 2 are to co-operate with corresponding parts of the brake disc(s). The brake disc(s) is received rotatably fixed to the sleeve 2 but moveable in an axial direction.

The outer periphery of the raised portions 4 and grooves 5, forming the splines of the sleeve 2, is straight and parallel with the main extent of the wheel axle. Expressed differently the sleeve 2 has a generally tubular form. The outer form of the sleeve 2 permits a brake disc to be slid off or onto the sleeve 2 in any axial direction.

A groove 6 is arranged in the sleeve 2, which groove is open towards one end of the sleeve 2. The groove 6 is parallel with the outer periphery of the sleeve 2 and is open in the direction away from the wheel flange 1. Thus, the groove 6 does not extend all the way to the end of the sleeve 2 to be attached to the wheel flange 1. By the groove 6 an inner wall 7 is formed at the inner periphery of the sleeve 2. The inner wall 7 has a shorter axial extension directed away from the wheel flange 1 than the outer wall of the sleeve 2.

At the open end of the groove 6, i.e. the end directed away from the wheel flange 1, a number of bridges 8 connect the inner wall 7 to the outer wall of the sleeve 2. The bridges 8 have a stiffening effect. The purpose of the groove 6 is to protect the bearing means placed between the inner wall 7 of the sleeve and the wheel axle against overheating. It is especially the grease of the bearing means that is in the risk of being overheated.

By the form and placement of the integrated sleeve 2 it is fairly simple to replace the brake disc. To replace the brake disc the bolts 3 are first unscrewed and the

wheel with the wheel flange 1 is lifted off. When the wheel has been lifted off the brake disc(s) may be slid on the splines 4,5 of the sleeve 2 out off the sleeve 2. Then a new brake disc may be slid back onto the splines 4,5 of the sleeve 2 and the wheel flange 1 is then fixed to the sleeve 2.

## CLAIMS

1. A sleeve (2) for a disc brake, which sleeve (2) has means (4,5) for co-operation with at least one brake disc, and which sleeve (2) is to be placed on a wheel axle, characterized in that the sleeve (2) has a groove (6), the main orientation of said groove (6) being parallel with the outer periphery of the sleeve (2).

2. The sleeve (2) of claim 1, characterized in that the groove (6) is open towards one end of the sleeve (2) and that the groove (6) forms an inner wall (7), which inner wall (7) is parallel with the outer periphery of the sleeve (2).

3. The sleeve (2) of claim 2, characterized in that a number of bridges (8) is arranged between the inner wall (7) and the rest of the sleeve (2), which bridges (8) are arranged in connection with the open end of the groove (6).

4. The sleeve (2) of any of the previous claims, characterized in that bearing means are arranged between the inner wall (7) of the sleeve (2) and the wheel axle

5. The sleeve (2) of claim 4, characterized in that the groove (6) has a cooling effect on the bearing means.

6. The sleeve (2) of any of the previous claims, characterized in that the means for co-operation with the brake disc is splines (4,5).

7. The sleeve (2) of any of the previous claims, characterized in that the sleeve (2) is attached directly to a wheel flange (1).

8. The sleeve (2) of claim 7, characterized in that the groove (6) is open in the direction directed away from the wheel flange (1).

9. The sleeve (2) of claim 7 or 8, characterized in that the sleeve (2) has threaded openings for receiving bolts (3), used to securely screw the sleeve (2) onto the wheel flange (1) and that the wheel flange (1) has openings corresponding to the threaded openings of the sleeve (2).



10. The sleeve (2) of any of the previous claims,  
characterized in that the sleeve (2) has a generally tubu-  
lar form, where the outer periphery of the sleeve (2) is  
generally straight and parallel with the main extent of the  
5 wheel axle, allowing a brake disc to be slid off or slid  
onto the sleeve (2) in any axial direction.

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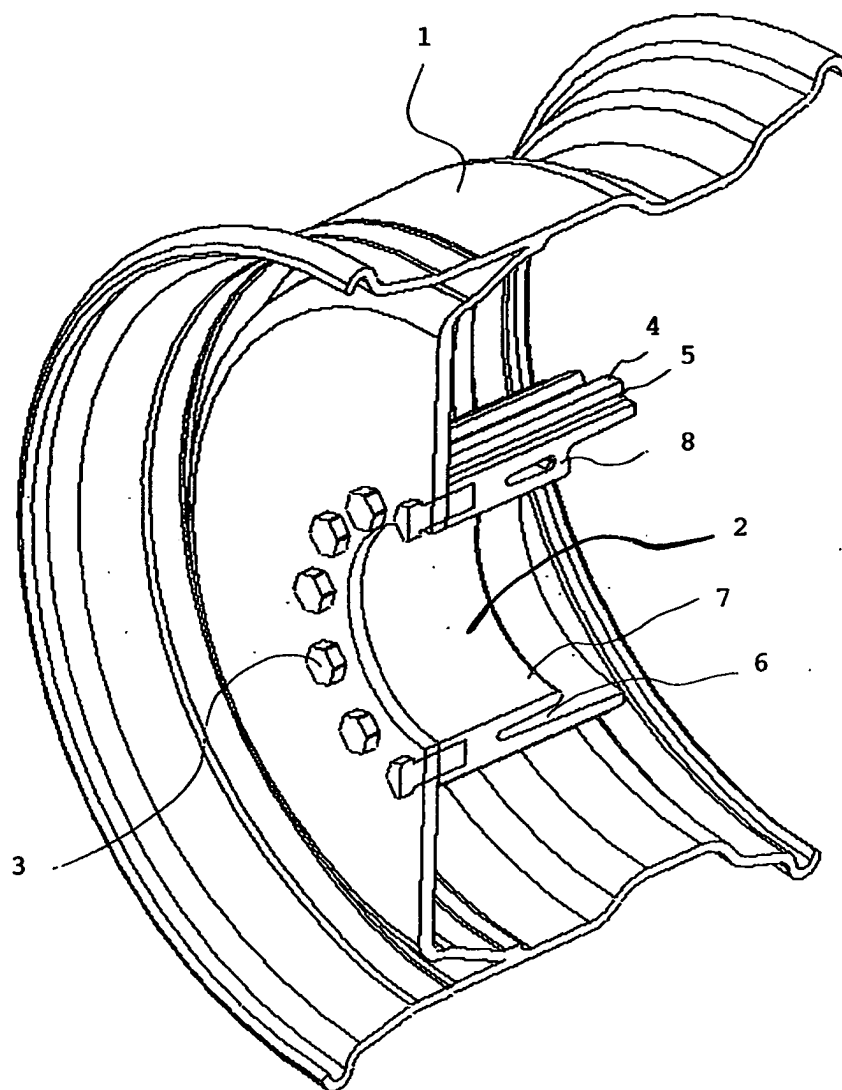


Fig. 1

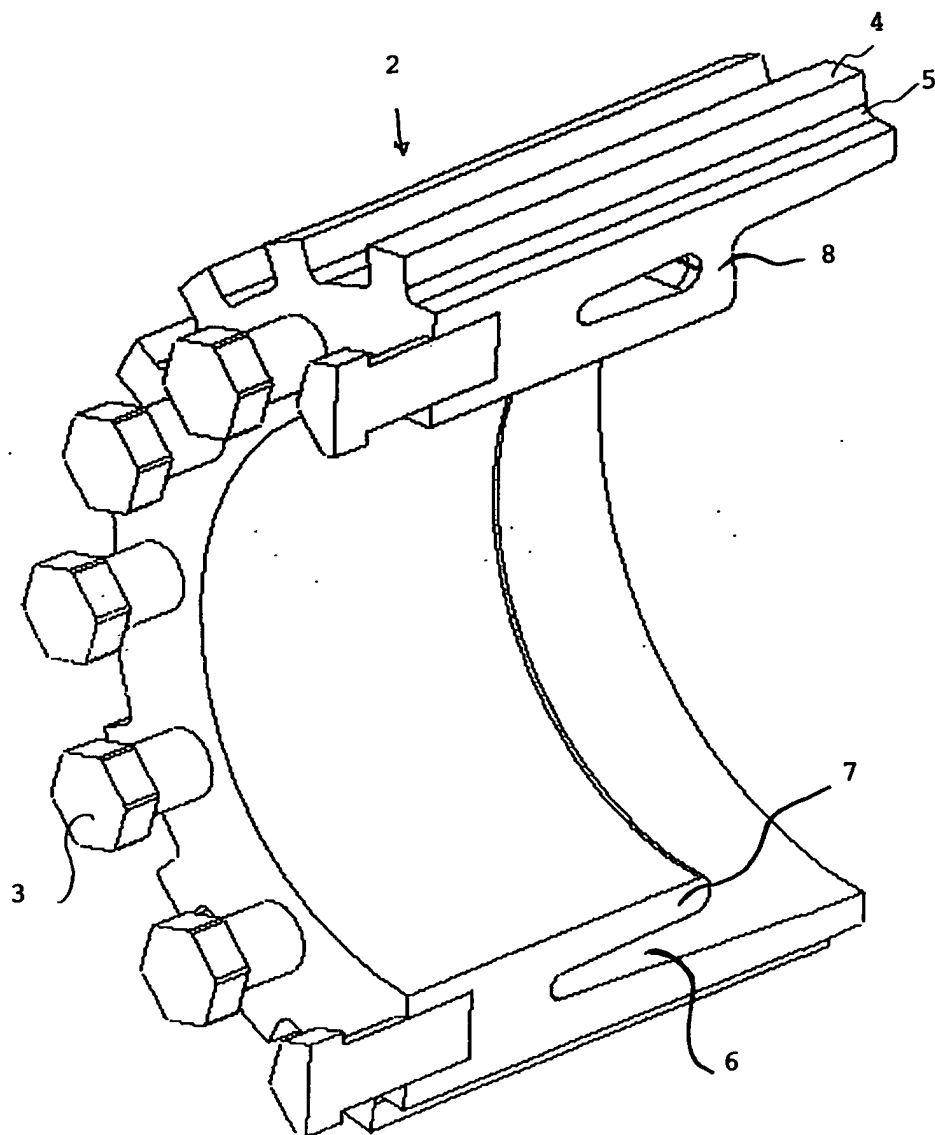


Fig. 2

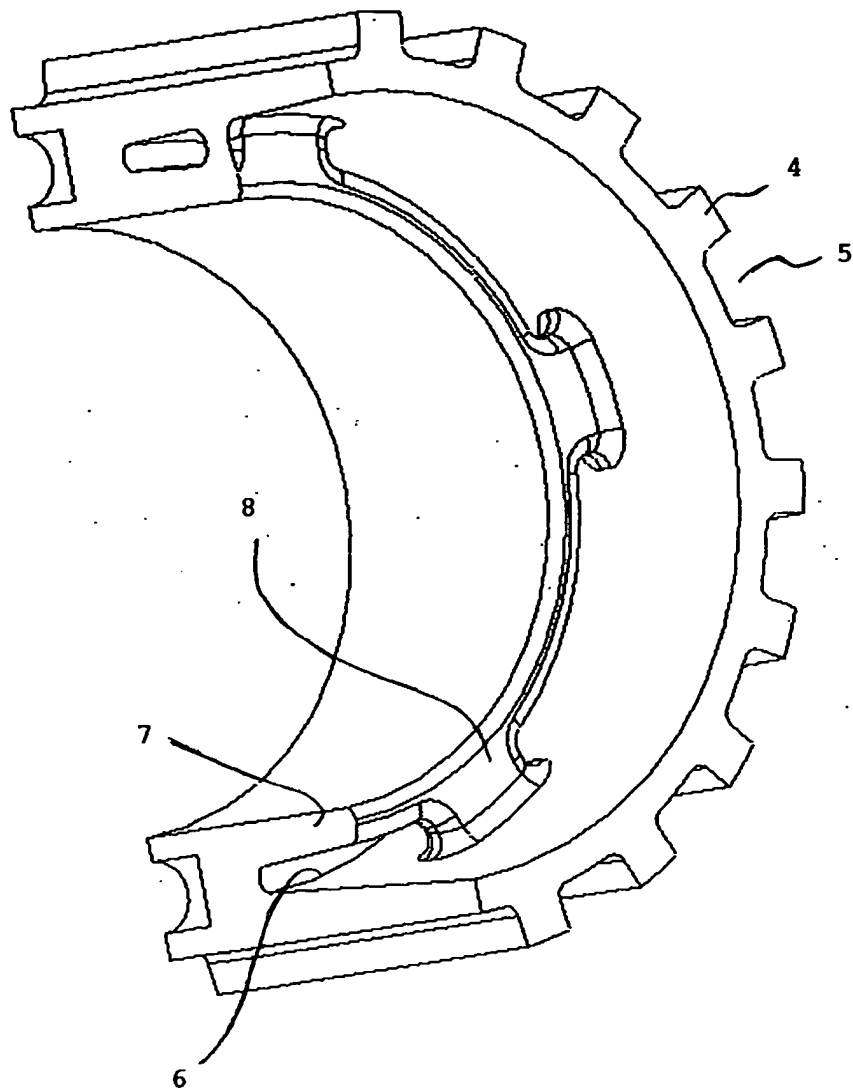


Fig. 3

## INTERNATIONAL SEARCH REPORT

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## A. CLASSIFICATION OF SUBJECT MATTER

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According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9314947 A1 (AB VOLVO), 5 August 1993 (05.08.93), page 4, line 25 - line 32, figures 1,2, claims 1-9, abstract ---	1-10
X	DE 19642166 A1 (GEORG FISCHER VERKEHRSTECHNIK GMBH), 16 April 1998 (16.04.98), figure 1, claims 1-3, abstract ---	1-10
A	US 5205380 A (PAQUET ET AL), 27 April 1993 (27.04.93), column 3, line 37 - line 41, figure 1 ---	1,4,6,7,9,10

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Swedish Patent Office

Box 5055, S-102 42 STOCKHOLM

Facsimile No. +46 8 666 02 86

Authorized officer

Alexandra Jarlmark/EK

Telephone No. +46 8 782 25 00

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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

02/09/02

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